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PLANETARY PHENOMENA FOR SEPTEMBER AND OCTOBER 1918.

MALCOLM MCNEILL.

PHASES OF THE MOON, PACIFIC TIME.

New Moon....	Sept. 5,	2^h	44^m	A. M.		New Moon....	Oct. 4,	7^h	5^m	P. M.
First Quarter..	" 13,	7	2	A. M.		First Quarter..	" 12,	9	0	P. M.
Full Moon.....	" 20,	5	1	A. M.		Full Moon.....	" 19,	1	35	P. M.
Last Quarter...	" 26,	8	39	P. M.		Last Quarter...	" 26,	9	35	A. M.

The Sun crosses the equator from north to south and the autumnal equinox occurs shortly after noon, September 23rd, Pacific Time.

Mercury is a morning star during the greater part of the period, coming to inferior conjunction on September 1st, and to superior conjunction on October 15th; greatest west elongation occurs on the early morning of September 18th. The distance from planet to Sun is 17°52′, rather a small greatest elongation, as the planet is in perihelion less than two days later; but the planet is also north of the Sun, so it will rise about an hour and a half before sunrise. It may therefore be seen for a week or more before and after the conjunction date in the early morning twilight. After passing conjunction on October 15th it becomes an evening star, but remains too near the Sun for observation. *Mercury* will be in conjunction with *Venus* twice, September 15th, 1 a. m. and September 25th, 1 a. m. Pacific time. Both planets are moving eastward among the stars, *Mercury* with a varying rate, about 30′ per day on September 14th, and 90′ per day on September 24th, *Venus* at a nearly constant rate of 60′ per day. On September 14th *Venus* overtakes and passes *Mercury*, the latter being south of *Venus* 1°20′ at the time of nearest approach. Then *Mercury* gains in speed and passes *Venus* on September 24th. This is a much closer conjunction, as at the time of nearest approach *Mercury* is only 20′ north of *Venus*.

Venus is still a morning star but its distance from the Sun is rapidly diminishing so that by the end of October the two bodies are nearly in conjunction. On September 1st the planet rises a little less than two hours before sunrise and on October 31st the interval is reduced to about half an hour. It will be practically impossible to see *Venus* during the last few days of October, on account of its small distance from the Sun combined with the condition that it is nearly at its least brightness, because it is in the part of its orbit beyond the Sun, consequently at nearly its greatest linear distance from the Earth. Its conjunctions with *Mercury* on September 14th and 24th have already been mentioned. A very close conjunction with *Saturn* will occur on September 4th, the least distance between the planets being only 5′. This is only a little more than the smallest distance distinguishable with the naked eye. Unfortunately, the time of day when this close approach occurs is 6 p. m., Pacific time, and therefore the planets will both be below the horizon for us in the United States, but the phenomenon can be observed in Western Asia. As we see them the planets will be quite near each other on the mornings before and after.

Mars is still observable in the western sky in the evening, setting a little more than two hours after sunset, the interval remaining practically constant throughout the two months. The apparent distance between planet and Sun diminishes from about 60° to about 45° with *Mars* far south of the Sun, but with a diminishing southerly distance; this last counterbalances the diminishing apparent distance in its effect on the interval between sunset and the setting of the planet, so the interval remains nearly constant. During the two months *Mars* moves among the stars about 45° eastward and 9° northward thru *Libra* and *Scorpio*. On October 12th *Mars* passes about 4° north of the first magnitude star *Antares*, *Alpha Scorpii*. On October 3rd it passes between *Beta* and *Delta Scorpii*. The planet will be rather brighter than these two stars, but considerably fainter than *Antares*. A good idea of its motion may be gained by watching its relation to the stars in *Scorpio* thru the first week in October. Its actual distance from the Earth in miles is still increasing but at a much smaller rate.

Jupiter rises before 1 a. m. on September 1st and shortly after 9 p. m. on October 31st. It is in the constellation *Gemini*, rather farther from the principal stars of the constellation than their distance apart, south and west of the stars, and moves about 6° eastward during the two months.

Saturn passed conjunction with the Sun on August 11th and is now a morning star, rapidly increasing its apparent distance from the Sun. On September 1st it rises about an hour and a half before sunrise, and by the end of October shortly before 1 a. m. It is in the constellation *Leo* and moves eastward and southward about 6° during the two months. At the end of October it is less than 2° west and north of the first magnitude star *Regulus*, *Alpha Leonis*.

Uranus passed opposition with the Sun on August 19th and is therefore above the horizon practically the whole night in early September, and at the end of October it does not set until after midnight. During the two months it moves about 1°30′ westward in the eastern part of *Capricorn*. About the middle of September it is extremely close to the fifth magnitude star, *Mu Capricorni*, the planet being a little to the south of the star, the least distance being at about the limit of naked-eye observation.

Neptune is in *Gemini* not far from *Saturn* but too faint to be seen without a telescope.